

CLAIMS

What is claimed is:

1. A micro-electro-mechanical system (MEMS) variable capacitor, comprising:
 - 5 (a) first and second actuation electrodes being spaced apart, and at least one of the actuation electrodes being about vertically movable with respect to the other actuation electrode when a voltage is applied across the first and second actuation electrodes;
 - 10 (b) a first capacitive electrode attached to and electrically isolated from the first actuation electrode; and
 - (c) a second capacitive electrode attached to the second actuation electrode and spaced from the first capacitive electrode for movement of at least one of the capacitive electrodes with respect to the other capacitive electrode upon application of voltage across the first and second actuation electrodes to change the capacitance between the first and second capacitive electrodes.
- 20 2. A micro-electro-mechanical system (MEMS) variable

capacitor, comprising:

- 5 (a) a movable component comprising a first and second portion attached to a substrate, wherein the first and second portion are spaced vertically with respect to one another with respect to the substrate;
- (b) first and second actuation electrodes being spaced apart, wherein the first actuation electrode is attached to a first portion of the movable component, wherein the second actuation electrode is attached to the substrate,
10 wherein the first actuation electrode is movable when a voltage is applied across the first and second actuation electrodes;
- (c) a first capacitive electrode attached to the substrate; and
- 15 (d) a second capacitive electrode attached to second portion of the movable component and spaced from the first capacitive electrode for movement of the first capacitive electrode with respect to the second capacitive electrode upon application of voltage across
20 the first and second actuation electrodes to change the

capacitance between the first and second capacitive electrodes.

3. The variable capacitor of claim 2, wherein the movable
5 component moves vertically with respect to the substrate.
4. The variable capacitor of claim 2, wherein the movable component moves rotationally with respect to the substrate.
- 10 5. A micro-electro-mechanical system (MEMS) variable capacitor, comprising:
 - (a) a movable component;
 - (b) a substrate attached to movable component, wherein the substrate comprises a first and second portion,
15 wherein the first and second portion are spaced vertically with respect to one another with respect to the movable component;
 - (c) first and second actuation electrodes, wherein the first actuation electrode is attached to the movable
20 component, wherein the second actuation electrode is

attached to the first portion of the substrate, wherein the first actuation electrode and movable component are movable when a voltage is applied across the first and second actuation electrodes;

5 (d) a first capacitive electrode attached to the movable component; and

(e) a second capacitive electrode attached to the second portion of the substrate, wherein the movable component moves of the first capacitive electrode with respect to the second capacitive electrode upon application of voltage across the first and second actuation electrodes to change the capacitance between the first and second capacitive electrodes.

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15 6. A micro-electro-mechanical system (MEMS) variable capacitor, comprising:

(a) first and second actuation electrodes being spaced apart, and at least one of the actuation electrodes being about vertically movable with respect to the other actuation electrode when a voltage is applied across the

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first and second actuation electrodes;

(b) a first capacitive electrode attached to and electrically isolated from the first actuation electrode; and

(c) a second capacitive electrode attached to the second
5 actuation electrode and spaced from the first capacitive electrode for movement of at least one of the capacitive electrodes with respect to the other capacitive electrode upon application of voltage across the first and second actuation electrodes to change the capacitance between
10 the first and second capacitive electrodes.